

AD-A038 973

MAXWELL SCHOOL OF CITIZENSHIP AND PUBLIC AFFAIRS SYR--ETC F/0 5/10  
MEASURING THE IMPACT ON SUBORDINATES OF MANAGERS, INTERPERSONAL--ETC(U)  
MAR 77 R KLAUSS

N00014-76-C-0912

UNCLASSIFIED

TR-2

NL

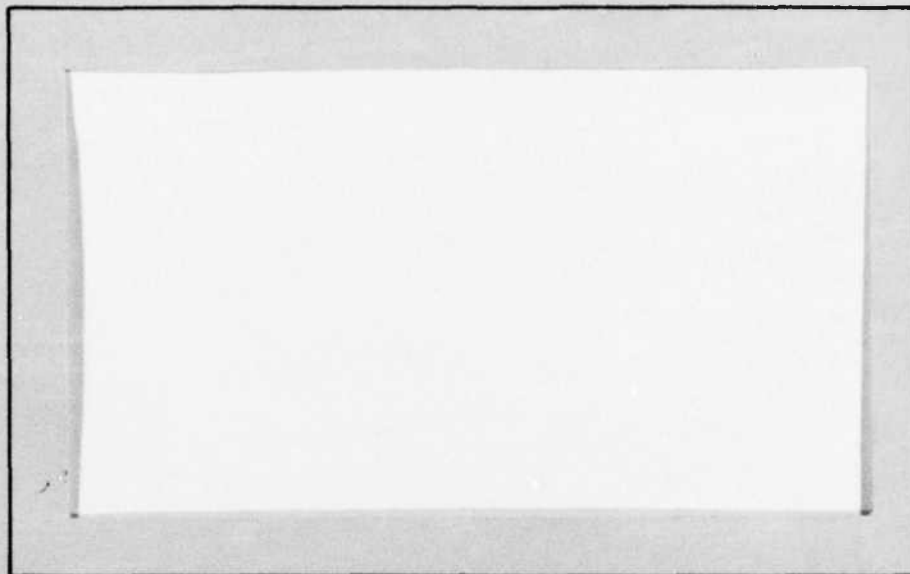
DF  
AD  
A038973



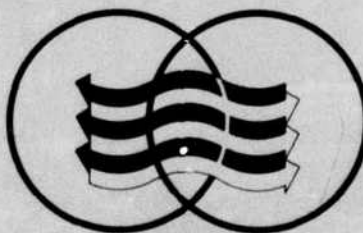
AD A 038973

12

~~12~~  
NW



MAXWELL TRAINING AND DEVELOPMENT PROGRAMS



AD No. \_\_\_\_\_  
DDC FILE COPY

*Graduate*  
THE MAXWELL SCHOOL OF CITIZENSHIP AND PUBLIC AFFAIRS  
SYRACUSE UNIVERSITY

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

MEASURING THE IMPACT ON SUBORDINATES  
OF MANAGERS' INTERPERSONAL  
COMMUNICATION STYLES AND CREDIBILITY

TR-2

Rudi Klauss  
Syracuse University

ACCESSION FOR	
NTIS	Write Section <input checked="" type="checkbox"/>
DDI	Duty Section <input type="checkbox"/>
UNCLASSIFIED	<input type="checkbox"/>
JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	AVAIL. and/or SPECIAL
A	

This research was sponsored by the Organization Effectiveness Research Programs, Office of Naval Research, under Contract No. N0001476-C-0912.

Approved for public release; distribution unlimited.

Reproduction in whole or in part is permitted for any purpose of the United States Government.

April 1977

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Technical Report 2 ✓	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER (14) TR-2
4. TITLE (and Subtitle) Measuring the Impact on Subordinates of Managers' Interpersonal Communication Styles and Credibility.		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) Rudi Klaus		6. PERFORMING ORG. REPORT NUMBER Research Report 2 ✓
9. PERFORMING ORGANIZATION NAME AND ADDRESS Maxwell Training & Development Programs Syracuse University 404 Maxwell Hall Syracuse, New York 13210		8. CONTRACT OR GRANT NUMBER(s) (15) N0001476-C-0912 ✓
11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Programs Department of the Navy, Office of Naval Research Arlington, VA 22217		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS (12) 66P.
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE March 1977
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Communication, communication model, interpersonal communication, role clarity, credibility, communication style, focal manager, communications factors.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This research investigated the relationship between managers' interpersonal communication behavior and subordinate satisfaction with supervision, job satisfaction and performance. A two-stage communication model was proposed and tested in which six interpersonal communication dimensions (careful presentation of ideas; open, two-way communication; frankness; careful listening; brevity; informality) serving as independent variables were seen to impact four intervening variables; subordinate role clarity,		

## 20. Abstract, cont.

cont → and three measures of manager source credibility (trustworthiness, informativeness, and dynamism). These intervening variables in turn were seen to influence the following dependent variables: subordinates' satisfaction with supervision; job satisfaction and work unit effectiveness.

The research design involved a cross-sectional questionnaire survey of 348 managers in a large organization. Respondents were asked to describe their own bosses in terms of the six interpersonal communication behavior dimensions mentioned above as well as the trustworthiness, informativeness and dynamism of their bosses. In addition, respondents provided data concerning their own sense of role clarity and information on measures of satisfaction and performance.

Multiple regression analysis, partial correlation analysis, and path analysis were used to test the hypotheses proposed by the model. The model explained 77 percent of the variance for "satisfaction with supervision" and considerably less variance for "job satisfaction" (30%) and "work unit effectiveness" (28%). The path analysis revealed somewhat differing configurations of independent and intervening variables depending on the particular dependent variable. However, certain key variables did appear to be important on a rather consistent basis. Among the interpersonal communication variables, "open, two-way communication" showed the strongest relationship with the intervening and dependent variable measures. "Brevity," "informality," "frankness" and to some extent "careful presentation" and "careful listening" also played a role, but not as consistently and strongly. Among the intervening variables, "trustworthiness," "informativeness" and "role clarity" showed the strongest relationship to satisfaction and performance.

Although the results were generally quite supportive of the model, a number of limitations were also noted: the cross-sectional nature of the research design, the restriction of sample to one organization, potential response bias, and the fact that the description of a given boss's communication behavior and of other measures of a given work situation was limited to one subordinate's perceptions.

## ABSTRACT

This research investigated the relationship between managers' interpersonal communication behavior and subordinate satisfaction with supervision, job satisfaction and performance. A two-stage communication model was proposed and tested in which six interpersonal communication dimensions (careful presentation of ideas; open, two-way communication; frankness; careful listening; brevity; informality) serving as independent variables were seen to impact four intervening variables; subordinate role clarity, and three measures of manager source credibility (trustworthiness, informativeness, and dynamism). These intervening variables in turn were seen to influence the following dependent variables: subordinates' satisfaction with supervision; job satisfaction and work unit effectiveness.

The research design involved a cross-sectional questionnaire survey of 348 managers in a large organization. Respondents were asked to describe their own bosses in terms of the six interpersonal communication behavior dimensions mentioned above as well as the trustworthiness, informativeness and dynamism of their bosses. In addition, respondents provided data concerning their own sense of role clarity and information on measures of satisfaction and performance.

Multiple regression analysis, partial correlation analysis, and path analysis were used to test the hypotheses proposed by the model. The model explained 77 percent of the

variance for "satisfaction with supervision" and considerably less variance for "job satisfaction" (30%) and "work unit effectiveness" (28%). The path analysis revealed somewhat differing configurations of independent and intervening variables depending on the particular dependent variable. However, certain key variables did appear to be important on a rather consistent basis. Among the interpersonal communication variables, "open, two-way communication" showed the strongest relationship with the intervening and dependent variable measures. "Brevity," "informality," "frankness" and to some extent "careful presentation" and "careful listening" also played a role, but not as consistently and strongly. Among the intervening variables, "trustworthiness," "informativeness" and "role clarity" showed the strongest relationship to satisfaction and performance.

Although the results were generally quite supportive of the model, a number of limitations were also noted: the cross-sectional nature of the research design, the restriction of sample to one organization, potential response bias, and the fact that the description of a given boss's communication behavior and of other measures of a given work situation was limited to one subordinate's perceptions.

MEASURING THE IMPACT ON SUBORDINATES OF  
MANAGERS' INTERPERSONAL COMMUNICATION  
STYLES AND CREDIBILITY

The importance of communication to the effective management of organizations is widely recognized. For example, many years ago Barnard suggested that " . . . in an exhaustive theory of organization, communication would occupy a central place, because the structure, extensiveness, and scope of organization are almost entirely determined by communication techniques " (Barnard, 1938, p. 91). Elsewhere, communication has been called the "very essence" of an organization (Katz and Kahn, 1966).

In spite of the general agreement concerning the importance of communication within organizations, our understanding of the critical components of effective communication and how these components affect organizational outcomes is quite limited. The organization theory literature provides relatively little specific guidance for developing an appropriate theoretical basis for viewing communication in organizations (Porter and Roberts, 1972; Klauss, 1977). The literature on communication theory and model building, though quite extensive, also has made less progress than might be hoped for (Thayer, 1967). Moreover, the amount of empirical research, particularly that which is related to important organization outcomes such as performance and satisfaction, is indeed quite limited.



### FOCUS OF PRESENT STUDY

The purpose of this report is to probe this area through empirical research and to report some findings concerning the relationship between managerial communication behavior and outcomes of satisfaction and performance. In particular, we are interested in examining specific dimensions of a manager's interpersonal communication behavior and how various dimensions may impact colleague satisfaction and work unit performance.

The basic model of managerial communication behavior being considered here investigates the following general working hypothesis: that a manager's interpersonal communication behavior has an important impact on colleague attitudes regarding job/role satisfaction, satisfaction with the focal manager in general, and also influences colleagues' job performance. Our concern goes beyond this basic hypothesis, however, to an examination of particular mechanisms which may help to explain the presumed linkages between a focal manager's communication behavior on the one hand and colleague attitudes and behavior on the other.\* More specifically, the following model has been formulated (Figure 1) which is based on an extensive review of the

---

\* Hereafter we will use the term "focal manager" to refer to the particular manager whose communication behavior is the focus of concern, while his "colleagues" are those persons in his immediate day to day work environment who constitute his main communication net (subordinates as well as peers and superiors).

literature on communication, employee performance and job satisfaction, as well as on preliminary research involving a sample of 397 industrial managers (Klauss, 1976). As can be seen, this model posits a set of causal linkages in which a manager's interpersonal communication style (ICS) - as operationalized by the six ICS variables listed in the model - is seen to affect colleagues in two important ways. First of all, it influences the extent to which colleagues have a clear understanding of their role responsibilities and relationships (role clarity), which in turn influences colleague satisfaction with focal person, general role satisfaction and performance. Secondly, the model suggests that a manager's communication behavior creates a certain image of manager credibility in the area of his perceived trustworthiness as a communicator, his informativeness, and dynamism (as seen by his colleagues), and this also has an important effect on colleague satisfaction and performance.

As indicated in the above discussion, this model relates a manager's interpersonal communication behavior to the key colleagues in his day to day working environment, whether they be subordinates, peers, or superiors. However, in the initial empirical examination of the model which is discussed below, we have restricted ourselves to an analysis of the superior-subordinate relationship. Subsequent research reports will incorporate peers as well as supervisors of focal managers.

### HYPOTHESES

Given the above focus on the superior-subordinate perspective for this current study, the following specific hypotheses embodied in our model have been examined:

Hypothesis 1. A supervisor's interpersonal communication behavior will be a significant predictor of subordinate role clarity.

Hypothesis 2. A supervisor's interpersonal communication behavior will be a significant predictor of supervisor credibility.

These two hypotheses thus examine the initial linkages from supervisor behavior to subordinate internalization of this behavior as sketched at the top of the model in Figure 1. They also set the framework for analysis of subsequent linkages.

The next two hypotheses examine the second set of linkages from the intervening variables (role clarity and supervisor credibility) to the dependent variables of concern. These linkages are hypothesized in the following manner:

Hypothesis 3. Subordinate role clarity will be a significant predictor of the following dependent variables: satisfaction with supervision, job satisfaction and work unit effectiveness.

Hypothesis 4. A supervisor's credibility as communicator will be a significant predictor of the following dependent variables: subordinate job satisfaction, satisfaction with supervision and work unit effectiveness.

Additional to testing the above sets of linkages proposed by our model, we have also considered the relationship between supervisor's interpersonal communication style

and the dependent variables in a more direct fashion. This allows us to later consider the extent to which the intervening variables contribute in the manner indicated by the model. This examination of the direct relationship between ICS variables and the dependent variable measures is expressed in the following terms:

Hypothesis 5. A supervisor's interpersonal communication behavior will be a significant predictor of the following dependent variables: subordinate satisfaction with supervision, job satisfaction and work unit effectiveness.

The remaining three hypotheses look more closely at the proposed causal sequence of linkages proposed in our model and specifically test the hypothesized importance of role clarity and supervisor credibility as central, moderating variables which can explain how supervisor communication behavior affects subordinate behavior and attitudes. These relationships are expressed in the following hypotheses:

Hypothesis 6. Role clarity will account for a significant amount of the correlation between the independent variables and the following dependent variables: subordinate satisfaction with supervision, overall job satisfaction, and work unit effectiveness.

Hypothesis 7. Supervisor credibility (as measured by supervisor trustworthiness, informativeness, and dynamism) will account for a significant amount of the presumed correlation between the independent variables and the following dependent variables: subordinate satisfaction with supervision, and overall job satisfaction and work unit effectiveness.

Hypothesis 8. The independent contribution of role clarity and supervisor credibility in combination will account for a significant amount of the presumed relationship between the independent variables and the following dependent variables: subordinate satisfaction with supervision, overall job satisfaction and work unit effectiveness.

## METHODOLOGY

Having presented our hypotheses for testing the model proposed earlier, we turn now to a discussion of the methodology employed in our research.

### Data Collection Strategy

The following data collection procedure was utilized in conducting this research. Some 450 managers (randomly identified from mailing lists containing the names of approximately 975 managers from a large industrial firm) were asked in a letter from the researcher to take part in this study. The randomly selected manager was sent a questionnaire which included biographical items, questions concerning his own boss's communication style as well as items pertaining to role clarity and his boss's credibility as a communicator (Appendix A). He was instructed to complete the questionnaire in terms of how he sees his boss as a communicator and how he perceives his own sense of role clarity, job satisfaction, satisfaction with supervision, and work unit effectiveness. The organization's interoffice mailing system was used to distribute the questionnaires and completed responses were in turn mailed by participants to a central collection point in the organization where they were picked up by the researcher.

A follow-up procedure to the first mailing was used to request people who did not complete the original questionnaire

to do so. The system worked as follows: each recipient of a questionnaire was asked to mail a postcard (enclosed with the questionnaire) to the researcher which indicated whether or not he had completed the questionnaire. He could also state on the card whether or not he wanted to receive a copy of the survey results. A master mailing list was used so that the researcher could check names on the postcards against the list and then contact each person who did not reply to the original mailing to urge their cooperation in the research. This procedure was designed to help reduce the non-response tendency which often occurs in survey research.

#### Operational Measures for Model Elements

The operational measures for the variables included in our model are briefly discussed below. (A more detailed discussion of the development and properties of these measures are provided in a previous report (Klauss, 1977).)

Independent variables. The six interpersonal communication style (ICS) variables identified in the model were derived from previous empirical research conducted by this researcher in which the responses of 397 managers to a questionnaire containing 73 items pertaining to interpersonal communication behavior were factor analyzed. The results of this analysis yielded the six factors in our model which are briefly defined as follows:

Factor I: Careful Presentation - carefully organizing

one's thoughts and choosing appropriate words when communicating with others.

Factor II: Open, Two-Way Communication - encouraging and using a style of open, free flow of two-way communication.

Factor III: Frankness - being frank, levelling with others, being self-assured in one's communication with others.

Factor IV: Careful Listening - attentiveness in listening to others.

Factor V: Brevity - a tendency not to be wordy or drift from topic to topic, etc.

Factor VI: Informality - a natural, relaxed, informal style of communicating.

From this analysis, scales with adequate reliability (.76 and above) were developed which resulted in a set of 25 items used in the research described here.

Intervening variables. Role clarity was measured by using a scale developed by Rizzo, House and Lirtzman (1970), and this scale has been previously used to examine the relationship of role clarity to measures of employee satisfaction and organizational effectiveness. The reported reliability of the six-item scale is .80.

Source credibility was viewed in terms of three separate dimensions: trustworthiness, informativeness, and dynamism. These scales were derived from the factor analytic work of Berlo, Lemert, and Mertz (1969) as well as Falcione (1974), and include a total of 20 items which ask the respondent to indicate the extent to which the statements describe his own perspective of his supervisor.

Dependent variables. Three dependent variable measures were utilized in this study. The first measure focused on subordinate satisfaction with supervision and the items on this scale have a reliability of .89 (Bass and Valenzi, 1974). The second scale measured overall job satisfaction, and has a scale reliability of .90. The third dependent variable scale was a measure of work unit effectiveness with a reported reliability of .95 (Bass and Valenzi, 1974), and recent research (Solomon, 1975) indicates that this scale has reasonably high convergent validity with objective, independently gathered measures of performance.

### RESULTS

As background to an examination of the results for the set of eight hypotheses, a few general comments are in order concerning the questionnaire response rate, the nature of our data, and the statistical procedures being employed.

As was indicated in the methodology discussion, the questionnaire-mailing procedure was designed so that reminder letters could be sent to persons who did not respond to the first letter. The initial mailing of 450 questionnaires brought in 291 completed responses (64 percent) within 14 working days. At that point, a reminder letter was sent to those who had not yet sent in their postcard, a process which yielded an additional 57 questionnaires. An analysis of the early versus late questionnaire respondents on all of the



biographical variables and variables in the model indicated only one significant difference in twenty-two comparisons, namely that the early respondents tended to have worked longer under their current boss (17 months) than the late respondents (13 months).

Given that the primary statistical procedure used in analyzing our data was multiple regression analysis, it was necessary to be sensitive to the assumptions which are linked to this type of analysis. It was recognized from the start that our ability to generalize the findings to a larger population of managers would be limited by the context within which this research was conducted. Hence it should be understood that the application of the inferential statistical procedures (that is, F test,  $R^2$ , testing for specific regression coefficients) was done in a tentative manner. It should also be noted that in performing the analyses which follow, attention was given to possible violations of the general assumptions which accompany regression analysis -- in particular, the assumptions of normality, linearity, and homogeneity of variance. With regard to the normal distribution assumption, in the case of the sample under consideration in this research, our N size was quite large and thus possible violations should not cause a serious problem. In considering the assumptions of linearity and homogeneity of variance, an examination of residuals and scatter plots suggested that the data did generally satisfy these requirements.

Mention should also be made of the moderate inter-correlation between some of the independent variables. As can be seen in the correlation matrix of key variables (Table 1), there were some problems in the case of a few variables. Thus, care must be taken in interpreting the relative importance of the independent variables, since regression coefficients may fluctuate quite a bit across samples under these conditions.

Having reviewed issues of general concern, we turn now to an examination of specific findings for the set of eight hypotheses listed earlier.

Hypothesis 1. Hypothesis 1 postulated that a supervisor's interpersonal communication behavior would be a significant predictor of subordinate role clarity. It was tested through a multiple regression analysis in which the six interpersonal communication style (ICS) variables served as independent variable predictors of role clarity (as the dependent variable). A regression routine (SPSS) which employs the standard regression method (each variable is treated as if it is being added to the regression equation after all other variables are included) was utilized in the analysis.

The results of this analysis are presented in Table 2. As can be seen, the F value was significant, thus providing support for the hypothesis. The  $R^2$  value was .38. The single

most important independent variable predictor appeared to be "two-way communication," with "informality" also emerging as a significant but less powerful factor.

Hypothesis 2. This hypothesis proposed that a supervisor's interpersonal communication style would be a significant predictor of supervisor credibility. In testing this hypothesis, the six ICS variables were used as the independent variable predictors of each of the three credibility factors.

The results are presented in Table 3, and indicate support for the hypothesis. All three F values were significant at the .01 level, with between 42 and 66 percent of the variance accounted for in the three regression analyses. The strongest relationship between the ICS variables and the credibility measures was with "trustworthiness" ( $R^2=.66$ ), while the amount of variance explained for "informativeness" and "dynamism" as dependent variables were somewhat less (46 and 42 percent). "Frankness," followed by "two-way communication," "informality," and "careful listening" were the most consistent predictors.

Hypothesis 3. Hypothesis 3 postulated that subordinate role clarity would be a significant predictor of subordinate satisfaction with supervision, job satisfaction, and work unit effectiveness. In testing this hypothesis a regression analysis was performed on each of the three dependent variable

measures with role clarity serving as the independent variable predictor for each run.

As Table 4 indicates, the hypothesized relationship was significant ( $p < .01$ ) as predicted for the three dependent variable measures in all instances. "Role clarity" appeared to have a fairly strong effect on "satisfaction with supervision" (with an  $R^2$  of .38), and a somewhat lower impact on "job satisfaction" (.19) and "work unit effectiveness" (.23).

Hypothesis 4. This hypothesis predicted that a supervisor's credibility as a communicator would be a significant predictor of the same three dependent variable measures (satisfaction with supervision, job satisfaction, and work unit effectiveness) indicated in Hypothesis 3. Using the three credibility measures (trustworthiness, informativeness, and dynamism) as independent variables, separate regressions were run on each of the three dependent measures.

The results of this analysis are reported in Table 5. All F values were significant, thus providing support for the stated hypothesis. "Trustworthiness" and "informativeness" were consistently significant predictors, while "dynamism" did not appear to have much of an impact at all. An examination of the  $R^2$  values indicated that by far the strongest impact of the credibility measures was on "satisfaction with supervision," with much less variance accounted for in the other dependent variable measures.

Hypothesis 5. Hypothesis 5 postulated that a supervisor's communication style (as represented by the six ICS variables) would significantly predict the three dependent variable measures in our model (subordinate satisfaction with supervision, job satisfaction and work unit effectiveness). Once again the same multiple regression analysis was performed with the six ICS variables as predictors in separate regression runs for each of the dependent variables.

As can be seen in Table 6, the hypothesis was supported for all three dependent variable measures. Once again, "satisfaction with supervision" had the greatest amount of explained variance, with an  $R^2$  value of .64. "Two-way communication" was a significant variable in all three analyses while "frankness" was significant in two cases.

Hypothesis 6. This hypothesis predicted that role clarity would account for a significant amount of the correlation between the six (ISC) independent variables and the three dependent variable measures identified in the model. As an initial test of this hypothesis, the relationship between each independent variable and the three dependent variable measures was examined before and after role clarity was statistically controlled (through partial correlation analysis). If the model and above hypothesis were correct, the partial correlation should be substantially lower in magnitude than the zero-order correlations between the independent and dependent variables.

The results of this analysis are presented in Table 7. As can be seen in comparing columns 1 and 2 for each dependent variable, there was a consistent drop in the magnitude of the partial coefficients for each of the six ICS variables.

As a further test of this hypothesis, stepwise multiple regression analysis was also employed. For each of the dependent variable measures separate regressions were run with role clarity as the primary predictor. Next the block of six independent variables was added as a secondary set of predictors. If role clarity were to mediate the independent variable-dependent variable relationship as predicted, (a) role clarity alone should account for a sizeable portion of the explained dependent variable variance, and (b) the introduction of the block of six ICS variables into the equation should not substantially increase the amount of explained dependent variable variance. As Table 8 indicates, role clarity does account for a sizeable portion of the explained variance for "work unit effectiveness" and to a lesser extent for "job satisfaction." However, "satisfaction with supervision" does not fit with our prediction. In testing the change in the  $R^2$  values between step one and step two in the regression analysis, two of the three increases were significant when the six ICS predictors were added to

the equation.\* Thus as with the partial correlation analysis, the pattern of results were generally in the predicted direction but not consistently dramatic from a statistical significance point of view.

Overall, therefore, the results of our analysis concerning hypothesis 6 can be said to provide only partial support for our model.

Hypothesis 7. Hypothesis 7 postulated that supervisor credibility (as measured by supervisor trustworthiness, informativeness, and dynamism) would account for a significant amount of the presumed correlation between the independent variables and the following dependent variables: subordinate satisfaction with supervision, job satisfaction and work unit effectiveness. This hypothesis was tested in a manner similar to the previous hypothesis. First, the relationship between each independent variable and the three dependent variable measures was examined before and after supervisor credibility (the intervening variable) was statistically controlled. This was done separately for each of the three factors constituting

---

\*The following formula was used to calculate whether the increases in  $R^2$ 's were significant:

$$F = \frac{(R^2_{y.12 \dots k_1} - R^2_{y.12 \dots k_2}) / (k_1 - k_2)}{(1 - R^2_{y.12 \dots k_1}) / (N - k - 1)}$$

(Kerlinger and Pedhazur, 1973, p 71).

supervisor credibility specified in the model as well as for all of them combined. If the model were correct, the partial correlations should be substantially lower in magnitude than the direct or zero-order correlations between the independent variables and the dependent variables.

As can be seen in Tables 9, 10, and 11, the general pattern of correlations and partial correlations supported the hypothesis. This was particularly evident when all three credibility variables were controlled, in which case the correlations tended to be low and nonsignificant except in the case of "satisfaction with supervision." It should be noted, however, that for "dynamism" the general pattern did not hold. That is, there was little or no change in the correlation coefficient when "dynamism" was held constant; in some instances the change was in fact upward.

A secondary analysis using multiple regression was also performed as follows. First the block of three credibility variables was introduced into the regression, followed by the addition of the block of ICS variables as the second step in the regression. If the credibility dimensions were to mediate the independent-dependent variable relationship as predicted, (a) the credibility measures alone should account for a sizeable portion of the explained dependent variable variance, and (b) the introduction of the second block of six ICS variables into the equation should not



substantially increase the amount of variance explained.

The results of this analysis are presented in Table 12 and indicate that the introduction of the second set of predictors did yield modest increases in the  $R^2$  values. However, in two of the three cases these increases were significant.

Overall, these two above analyses together tend to provide a fair amount of support for the hypothesis.

Hypothesis 8. This hypothesis postulated that the independent contribution of role clarity and supervisor credibility in combination would account for a significant amount of the presumed relationship between the independent variables and the following dependent variables: subordinate satisfaction with supervision, overall job satisfaction and work unit effectiveness.

This hypothesis was tested in the following manner. A multiple regression analysis was employed with role clarity and supervisor credibility as primary predictors of the dependent variables. The six independent variable measures were then added as secondary predictors. If role clarity and supervisor credibility were to mediate the independent-dependent variable relationship as predicted, (a) the intervening variables (role clarity and supervisor credibility) in combination should account for a sizeable portion of the dependent variable variance and (b) the introduction of the six interpersonal communication dimensions into the equation

as additional variables should not substantially increase the amount of dependent variable variance controlled.

The results of this analysis are presented in Table 13. As can be seen, the changes in  $R^2$  were very modest and in two of the three instances were statistically nonsignificant. The only exception was for "satisfaction with supervision." Hence we are inclined to conclude general support for our model.

#### Path Analysis Pertinent to Hypotheses 6-8

In addition to the above tests for hypotheses 6-8, a path analysis was also performed to further examine the relationships proposed in our model. In particular we were interested in exploring the extent to which simpler models might be obtained which supported our proposed causal linkages and which might yield close to the same amount of explained dependent variable variance with fewer variables.

The methodology of path analysis was originally developed by Wright (1921, 1934) as a quantitative tool for use in biological research. More recently, social science researchers have been turning increasingly to path analysis as a potential tool for dealing with methodological issues in research involving causal models (Duncan, 1966; Blalock, 1967; Heise, 1969).

In his early writings on this subject, Wright indicated

that:

The method of path coefficients is not intended to accomplish the impossible task of deducing causal relations from the values of the correlation coefficients (1934, p. 193).

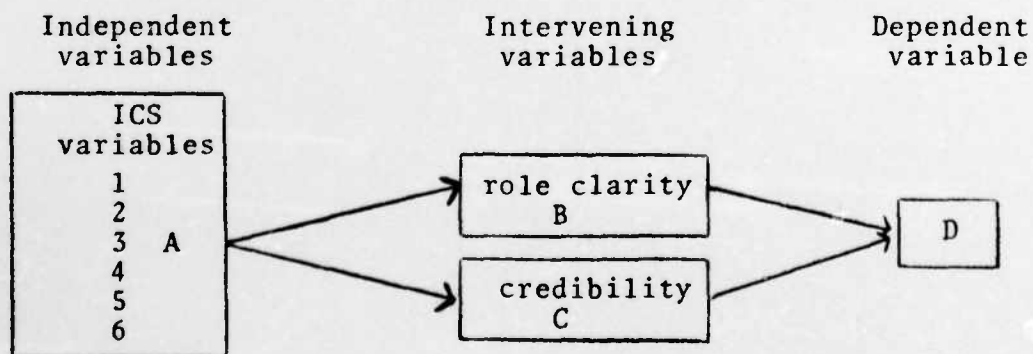
Rather it is primarily a method for testing a theory in which a weak causal order among variables is indicated and where the relationships among these variables are seen to be causally closed (Nie et al., 1975, p. 383). Thus, path analysis is not a method for discovering causal relationships but can be appropriately used when interpreting the tenability of a theoretical model proposed by the researcher.

Underlying the principles of path analysis and its application to proposed causal models is a distinction between exogenous and endogenous variables. To paraphrase Kerlinger and Pedhazur (1973, p. 308), exogenous variables are those whose variability is presumably determined by causes external to the model, while for endogenous variables, their variation is explainable by exogenous or other endogenous variables in the model. Within a given model an endogenous variable may at one point serve as a dependent variable in relation to independent variables which precede it, and at a later point in the causal chain this same endogenous variable may be seen as an independent variable predicting another variable which comes after it in the causal flow depicted by the model. In addition to these two categories of variables, the notion of residual variables

is utilized in path analysis to indicate the effect of variables not incorporated directly into the model.

Path analysis requires making certain assumptions of the following nature: that relations among the variables in the system are linear, additive and causal; that the residuals are not correlated with each other or with the variables in the system; that there is a one-way causal flow in the model; and that the scale measures are interval level in nature (Kerlinger and Pedhazur, 1973). These assumptions, when seriously violated, can result in misleading interpretations. As with most other methodological procedures, this technique cannot be viewed as the final answer when attempting to understand complex patterns of relationships among variables in a given system. However, when applied with caution and discretion, it can be quite useful in interpreting data of the sort found in the present study.

In the present study, the application of path analysis involved the determination of the path coefficients (standardized regression coefficients) for the various hypothesized causal paths depicted in the general path diagram outlined below:



This set of relationships was proposed for each of the three dependent variable measures and hence our analysis involved an examination of such a path diagram for each dependent variable.

The following procedure was employed for calculating the path coefficients for each diagram:

1) Regress D on A, B, and C. This provided initial path coefficients from B and C to D, as well as for any direct paths from A to D;

2) Regress B on A. This provided the path coefficients from A (variables 1-6) to B;

3) Regress C on A. This provided the path coefficients from A (variables 1-6) to C.

Having performed the initial analysis outlined above for a given diagram, the resulting path coefficients were examined to see if a simplified model could be obtained. Paths with coefficients less than or equal to .10 were dropped, as well as any paths where the coefficients might be greater than .10 but were nonsignificant (Land, 1969). Then, new path coefficients for the retained variables in the diagram were calculated. The resulting model for each dependent variable is presented in Figures 2 to 4.

As a test of whether the data were consistent with these revised, more parsimonious models, the new path

coefficients were utilized in an attempt to reproduce the original bivariate correlations among the key variables (Kerlinger and Pedhazur, 1973) for each model. In performing this analysis it should be noted that double-arrowed paths among the six ICS variables, though not included in the diagrams, were assumed and used in the reconstruction process. This was done on the basis that the behaviors represented here, though factorially relatively independent, are related conceptually in that all represent interrelated behavior concerning a person's interpersonal communication style.

The results of the analysis are reported in Tables 14 to 16. Of particular interest in exploring the "adequacy" of the simplified models were the differences between the actual correlations and the synthetic correlations (reconstructed correlation using the paths between variables of concern). As a rough indicator of adequacy, average differences for each diagram were calculated and are reported in the third column of each table. An examination of these values as well as of the individual discrepancies reported in the column suggests that for the most part the three models tended to hold up reasonably well.

Turning for a moment to the actual path diagrams (Figures 2 to 4), it can be seen that the specific set of relationships contained in each model changed somewhat, depending

on the dependent variable under consideration. Nevertheless, many of the relationships were rather consistently represented in each model. Hence the path analysis did help to highlight certain key variables and also provided some direction for subsequent theory trimming in the future development and refinement of the general theoretical model proposed in this study.

### DISCUSSION AND CONCLUSIONS

The results presented here suggest some patterns which deserve brief attention below. In addition, we need to examine some of the limitations of our research and suggest possible future directions for extending this research effort. First, let us discuss the results obtained for each of the three dependent variables.

#### Satisfaction with Supervision

Of all three dependent variables considered in this study, "satisfaction with supervision" yielded the strongest set of relationships in support of our model. For example, a glance at Table 13 and the path diagrams indicate that 77 percent of the variance was accounted for with this dependent variable, while in contrast the  $R^2$  for "job satisfaction" was .30 and for "work unit effectiveness" it was .28. Similar patterns were found for the regression analyses reported in

the initial tests of our research hypotheses (Tables 2 to 12).<sup>\*</sup> This would suggest that managerial communication behavior has its most direct impact on subordinates in the area of satisfaction with supervision, and that a more complex set of factors perhaps come into play when considering employee job satisfaction and work unit effectiveness.

Apart from this general observation regarding the stronger relationship shown for "satisfaction with supervision," it is interesting to note which specific variables in our model seem to have the greatest impact. Among the intervening variables under consideration, "trustworthiness" "informativeness" and "role clarity" are consistent predictors, while "dynamism" is hardly represented.

In the case of "informativeness," the path analysis and regression analysis both indicate a strong and consistent relationship between this variable and "satisfaction with supervision" thus suggesting that those persons who are more satisfied with the kind of supervision they get see their bosses as well-qualified, well-informed managers. The most critical managerial communication behaviors (ICS variables) contributing to this image of the boss would appear to be

---

<sup>\*</sup>Throughout the rest of this discussion, we will be using the term "regression analysis" as a shorthand way of distinguishing the specific regressions which were performed as the primary tests of our hypotheses (Tables 2 to 13) from the path analyses -- even though it is clear that path analysis also involves regression analysis.



"open, two-way communication," "frankness," and "careful presentation" of messages, and to a lesser extent "brevity" and "informality" (Table 3, Figure 2).

Perceived "trustworthiness" of one's boss also appears to have a strong influence on "satisfaction with supervision." Here the most critical ICS variables appear to be "open, two-way communication" and "informality," with "careful listening" and "frankness" (negatively in the regression analysis) revealing a lesser degree of importance.

"Dynamism" and "role clarity" emerge in the regression analysis as significant but not very powerful predictors and wash out in the path analysis. Hence we are inclined to conclude that these two variables are probably not particularly critical for understanding subordinate satisfaction with supervision.

It might be noted that in addition to the above linkages which have been discussed that a few ICS variables appear to have direct impact on "satisfaction with supervision" (in addition to indirect impact via the intervening variables). In particular, "open, two-way communication" appears to make a consistently important, independent contribution to the dependent variable, both in the path analysis and in the regular regression analysis.

To summarize these above findings we tentatively conclude that, for the organization from which our sample

came, a considerable part of a subordinate's "satisfaction with supervision" can be understood in terms of the extent to which he finds his boss to be a trustworthy (fair, cooperative, reasonable, safe) person to work under and also on the basis of the boss's informativeness (that is, being well-qualified, well-informed) in managing the work situation. Furthermore, this image of trustworthiness and informativeness seems to be considerably influenced by the extent to which he encourages open, two-way communication and to some extent by his informality in communicating with subordinates, careful presentation of ideas, careful listening and brevity. Frankness can cut both ways, in that it may increase the perception of supervisor informativeness, but can also negatively impact perceived trustworthiness (sense of safety, friendliness) of the supervisor.

#### Job Satisfaction

The pattern of relationships found for "job satisfaction" were not as strong as those just discussed. For example, the  $R^2$  value obtained when all the original independent variables were included in the analysis was only to .30 -- a considerable decline from that found for "satisfaction with supervision." In part, this phenomenon can be understood in terms of previous research which indicates that job satisfaction is multidimensional in nature and is therefore more difficult to adequately measure.

Moreover, other issues relating to the job situation (for example, satisfaction with colleagues, job challenge, etc.) as well as the interpersonal communication milieu may influence overall subordinate job satisfaction (Smith, Kendall, and Hulin, 1969).

Turning to specific findings concerning the model, we find that among the four intervening variables which were originally proposed that, as in the case of satisfaction with supervision, informativeness and trustworthiness once again emerge as important intervening variables. Role clarity also appears to have an impact, while dynamism does not. It might be noted that "careful presentation" and "informality" both suggest low (negative) but significant independent linkages directly to "job satisfaction" in the path and regression analyses. Yet their linkages to the intervening variables have a positive valence. This pattern cannot be readily explained by the data at hand. The impact of "role clarity" on job satisfaction is quite well supported in previous research (Miles, 1975; Keller, 1975; Organ and Greene, 1974; House and Rizzo, 1972) where "role clarity" has been shown to be similarly linked. The most critical ICS variable related to role clarity is clearly "open, two-way communication" while "informality" also appears to have a minor, though statistically significant, impact (Table 2; Figure 3). Thus it would appear that a key to increased

role clarity is a communication relationship between subordinate and supervisor which is relatively informal and involves a continuing two-way dialogue concerning the job.

In generalizing on the patterns discussed above concerning job satisfaction, it appears that within the firm under consideration that an important part of a subordinate's job satisfaction comes from an increased sense of role clarity and perception that the boss is well informed about the job situation and is trustworthy. Contributing to these factors is a set of managerial communication behaviors, particularly open, two-way communication, and to a lesser extent informality, frankness, careful presentation of ideas, brevity and careful listening which in turn appear to contribute to job satisfaction.

#### Work Unit Effectiveness

As with "job satisfaction," the amount of variance explained for "work unit effectiveness" by our model (.28) was quite a bit below that of "satisfaction with supervision." This can be understood in part by the fact that work unit effectiveness is influenced by a range of factors well beyond the interpersonal communication context, including such potential variables as technology considerations, experience and training of colleagues in a work unit, external constraints such as resource shortages, etc.

Among the four intervening variables originally suggested by our model, "role clarity," "trustworthiness" and "informativeness" again appear to be important while "dynamism" is not a significant factor. Unlike the job satisfaction path diagram, there are no independent linkages from the ICS communication variables directly to the dependent variable. It might also be noted that role clarity appears to become more critical for work unit effectiveness as compared with job satisfaction. Thus we are inclined to conclude that when it comes to assessing the impact of managerial communication behavior on work unit performance that a clear sense of role responsibilities (clarity) on the part of the subordinates and perception of the boss as a well-informed and trustworthy/reliable source of information and support are important for increased work unit effectiveness. Furthermore, the key managerial communication behaviors which appear to contribute to such a situation are open, two-way communication, and to some extent, informality, frankness, brevity, careful presentation of messages and careful listening.

#### Cautions and Limitations to This Research

Given the exploratory nature of the model and research reported here, a good deal of caution must be observed in generalizing on the findings which have been obtained. It must be remembered first of all that we are limited in this study to one organization. Additional research in different

types of organizational settings will be needed before we can begin to establish confidence in some of the patterns which have emerged here.

The nature of our research design and data collection procedure also poses a number of constraints. While the response to the survey was indeed quite high, nevertheless there was that 20 to 25 percent who did not choose to participate. In addition it must be noted that our data is based on one person's perception of his own boss. Future research designs will enable us to get a broader perspective of the particular boss in question and permit us to examine the extent to which individuals vary in their perceptions and attitudes along the dimensions included in our study. In the present study, however, this type of analysis was not possible.

In dealing with attitudes and perceptions reported in a survey instrument of the sort used in this study we must also be cognizant of the potential for a halo effect in the response patterns of participating managers. To the extent possible our questionnaire attempted to get respondents to evaluate each item by itself. Items pertaining to individual scales were scattered throughout the various sections of the questionnaire. In addition, items pertaining to the same factor or scale were occasionally worded in opposite directions as a check on a possible tendency to use the same anchor

points in responding to the questions.

In spite of these procedural safeguards, however, the potential for a halo effect and response bias cannot be completely discounted. This issue may be especially pertinent to the interpersonal communication variables which revealed moderately high intercorrelations. Subsequent research involving multiple perceptions of a given manager from various subordinates, peers and others in that person's communication net may help deal with this issue to some extent.

Finally, we need to underscore here that we are dealing in this study with a cross section of data which is correlational in nature. We have occasionally implied or used the term "predictor" in the discussion of our results in a shorthand fashion to refer to regression analyses where certain variables were chosen as independent variables (predictors) for selected dependent variable measures. Clearly, the use of the term "predictor" when applied at a more general level implies a causality which cannot be conclusively determined from a research design of the sort employed here. This, of course, also applies to our path analysis, which we applied primarily as a tool for theory-trimming purposes and did not explore possible alternative competing causal models. A more extensive consideration of potentially competing causal

models will be appropriate once we increase our data base on the variables included in our models (an effort currently in progress), and particularly as we find opportunities for conducting longitudinal studies and occasions for increased experimental control.

With regard to the present research, it must be recognized that the results reported here, at best, provide tentative support of the proposed model. The possibility of two-way causation, particularly between the ICS variables and the intervening variables, but also vis-a-vis our dependent variables cannot be ruled out. Nor can we ignore the fact that we have been able to account for only a certain percentage of the total variance in each dependent as well as intervening variable. This can be noted by reexamining Figures 2 to 4 which indicate the  $R^2$  values pertaining to the intervening and dependent variables displayed in each diagram. This data suggests the possibility in future research of considering additional variables which may relate to our model.

#### Summary and Conclusions

This entire study has been focused on an underlying notion that managerial interpersonal communication behavior, mediated through role clarity and manager credibility, significantly affects subordinate satisfaction and performance.



At a general level, our research findings have been basically supportive of the model which was proposed. In particular we have noted that the model explains 77 percent of the variance for "satisfaction with supervision." Considerably less variance is explained for "job satisfaction" and "work unit effectiveness" (30 and 28 percent), although even here the results are by no means discouraging.

It appears that our path diagrams are useful in helping to provide more parsimonious explanations of the way in which the various variables may operate in our models. Even so, it is clear that the findings are complex -- in that somewhat different configurations of predictor variables emerge depending on the dependent variable. However, certain key variables do seem to be important across situations in a rather consistent fashion. Among the ICS variables, "open, two-way communication" is clearly the strongest factor throughout. "Brevity," "informality," "frankness" and to some extent "careful presentation" and "careful listening" also figure into the picture, but not as consistently. Among the intervening variables, "trustworthiness," "informativeness" and "role clarity" emerge on a consistent basis while dynamism is not a strong factor, contrary to our originally proposed model. Future research should help to further piece out the relative contributions of these variables and establish the stability of these findings across organizational settings.

TABLE 1  
CORRELATION MATRIX OF KEY VARIABLES (N=348)

	2 Way	Frank	Listen	Brevity	Inform	Trust	Info	Dynamism	RC	Satsup	Jobsat	Weff
Careful presentation (CP)	.37	.41	.50	.52	.23	.36	.48	.21	.32	.43	.16	.20
Two-way communication (2 way)		.55	.56	.38	.61	.75	.54	.27	.58	.72	.44	.36
Frankness (Frank)			.36	.39	.46	.41	.58	.61	.42	.58	.27	.28
Careful listening				.69	.48	.57	.45	.04*	.36	.53	.29	.29
Brevity					.33	.38	.48	.13	.33	.47	.18	.22
Informality						.69	.59	.21	.43	.61	.29	.30
Trust							.59	.19	.57	.74	.46	.39
Informativeness (Info)								.51	.51	.78	.44	.41
Dynamism									.28	.44	.27	.18
Role Clarity (RC)										.60	.43	.48
Satisfaction with supervision (Satsup)											.54	.53
Job satisfaction (Jobsat)												.44
Work unit effectiveness (Weff)												

NOTE: All coefficients are significant at .01 level except one (starred).

TABLE 2  
MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 1  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Independent variables (ICS)	Intervening variable Role Clarity
Careful presentation	.06
Two-way communication	.44*
Frankness	.08
Careful listening	-.04
Brevity	.09
Informality	.12*
F	32.23*
Multiple R	.62
R <sup>2</sup>	.38

NOTE: Beta weights - standardized regression coefficients

\*  $p < .01$

TABLE 3  
MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 2  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Independent variables (ICS)	Intervening variables		
	Trust- worthiness	Inform- ativeness	Dynamism
Careful presentation	.05	.18*	.03
Two-way communication	.50*	.22*	.08
Frankness	-.09*	.26*	.65*
Careful listening	.14*	-.03	-.30*
Brevity	-.02	.13*	.04
Informality	.35*	.14*	-.03
F	102.51*	45.88*	37.89*
Multiple R	.81	.68	.65
R <sup>2</sup>	.66	.46	.42

NOTE: Beta weights = standardized regression coefficients

\*  $p < .01$

TABLE 4

REGRESSION ANALYSES FOR HYPOTHESIS 3  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Intervening Variable	Dependent Variable		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Role Clarity	.62*	.44*	.48*
F	197.52*	76.74*	94.98*
Multiple R	.62	.44	.48
R <sup>2</sup>	.38	.19	.23

\*  $p < .01$

TABLE 5

MULTIPLE REGRESSION ANALYSES FOR HYPOTHESIS 4  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Intervening Variable	Dependent Variable		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Trustworth- iness	.45*	.32*	.26*
Informative- ness	.46*	.20*	.27*
Dynamism	.12*	.08	-.00
F	296.46*	35.21*	29.03*
Multiple R	.86	.50	.46
R <sup>2</sup>	.73	.25	.21

\*  $p < .01$

TABLE 6

MULTIPLE REGRESSION ANALYSES FOR HYPOTHESIS 5  
WITH REGRESSION BETA WEIGHTS AND PERTINENT STATISTICS

Independent Variables (ICS)	Dependent Variable		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Careful presentation	.07*	-.05	.00
Two-way communication	.43*	.41*	.22*
Frankness	.16*	.05	.10*
Careful listening	.02	.05	.09
Brevity	.12*	-.01	.02
Informality	.21*	.00	.09
F	95.41*	16.24*	12.78*
Multiple R	.80	.45	.41
R <sup>2</sup>	.64	.20	.17

\* $p < .01$

TABLE 7

RELATIONSHIP OF ICS VARIABLES TO DEPENDENT VARIABLES  
WITH AND WITHOUT ROLE CLARITY HELD CONSTANT

ICS Variables	Satisfaction with Supervision		Job Satisfaction		Work Unit Effectiveness	
	(1)	(2)	(1)	(2)	(1)	(2)
Careful presentation	.44	.34	.16	.02*	.20	.07*
Two-way communication	.73	.58	.45	.26	.38	.14
Frankness	.57	.44	.27	.10*	.29	.12
Careful listening	.55	.43	.28	.13	.29	.15
Brevity	.47	.36	.18	.04*	.23	.09*
Informality	.61	.49	.28	.10*	.31	.13

NOTE: (1) = zero order correlation

(2) = holding role clarity constant

\* non significant; all other correlations significant  
at  $p < .05$  or better

TABLE 8

MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 6  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Independent Variables	Dependent Variables		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Step one			
Role clarity alone	.62**	.44**	.48**
F	197.53**	76.74**	94.98**
Multiple R	.62	.44	.48
R <sup>2</sup>	.38	.19	.23
Step two			
Role clarity	.21**	.28**	.37**
Careful presentation	.06*	-.07	-.03
Two-way communication	.34**	.29**	.05
Frankness	.15**	.03	.07
Careful listening	.03	.06	.10
Brevity	.10**	-.03	-.01
Informality	.19**	-.04	.05
F	91.55**	15.16**	15.29**
Multiple R	.82	.50	.50
R <sup>2</sup>	.671	.251	.25

\*p<.05    \*\*p<.01    1increase in R<sup>2</sup> is significant

TABLE 9

RELATIONSHIP OF ICS VARIABLES TO DEPENDENT VARIABLES  
WITH AND WITHOUT CREDIBILITY MEASURES  
(TRUSTWORTHINESS, INFORMATIVENESS, AND DYNAMISM)  
HELD CONSTANT

ICS Variables	(1)	(2)	(3)	(4)	(5)
Satisfaction with Supervision					
Careful presentation	.44	.29	.14	.40	.10*
Two-way communication	.73	.41	.58	.71	.34
Frankness	.57	.46	.26	.44	.19
Careful listening	.55	.24	.36	.60	.22
Brevity	.47	.33	.23	.46	.20
Informality	.61	.23	.45	.60	.19

TABLE 10

RELATIONSHIP OF ICS VARIABLES TO DEPENDENT VARIABLES  
WITH AND WITHOUT CREDIBILITY MEASURES  
(TRUSTWORTHINESS, INFORMATIVENESS, AND DYNAMISM)  
HELD CONSTANT

ICS Variables	(1)	(2)	(3)	(4)	(5)
Job Satisfaction					
Careful presentation	.16	.01*	-.05*	.11	-.08*
Two-way communication	.45	.19	.28	.41	.14
Frankness	.27	.11	.03*	.16	-.03*
Careful listening	.28	.03*	.11	.28	.01*
Brevity	.18	.02*	-.01*	.15	-.05*
Informality	.28	-.04*	.10*	.25	-.07*

NOTE: (1) = zero order correlation  
(2) = holding trustworthiness constant  
(3) = holding informativeness constant  
(4) = holding dynamism constant  
(5) = holding all credibility variables constant

\* nonsignificant; all other correlations significant at  $p < .05$  or better

TABLE 11

RELATIONSHIP OF ICS VARIABLES TO DEPENDENT VARIABLES WITH  
AND WITHOUT CREDIBILITY MEASURES (TRUSTWORTHINESS,  
INFORMATIVENESS, AND DYNAMISM) HELD CONSTANT

ICS Variables	(1)	(2)	(3)	(4)	(5)
Work Unit Effectiveness					
Careful presentation	.20	.07*	.01*	.17	-.02*
Two-way communication	.38	.12	.20	.35	.07*
Frankness	.29	.16	.08*	.24	.07*
Careful listening	.29	.09*	.14	.30	.05*
Brevity	.23	.09*	.05*	.21	.02*
Informality	.31	.05*	.15	.29	.02*

NOTE: (1) = zero order correlation  
 (2) = holding trustworthiness constant  
 (3) = holding informativeness constant  
 (4) = holding dynamism constant  
 (5) = holding all credibility variables constant

\*nonsignificant; all other correlations significant at  
 $p < .05$  or better



TABLE 12

MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 7  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Independent Variables	Dependent Variables		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Step one			
Trustworthiness	.45*	.32*	.26*
Informativeness	.45*	.20*	.27*
Dynamism	.12*	.08	-.01
F	296.46*	35.21*	29.03*
Multiple R	.86	.50	.46
R <sup>2</sup>	.73	.25	.21
Step two			
Trustworthiness	.22*	.24*	.19*
Informativeness	.38*	.24*	.25*
Dynamism	.10*	.09	-.03
Careful presentation	-.01	-.11*	-.06
Two-way communication	.23*	.23*	.07
Frankness	.02	-.05	.07
Careful listening	.04	.06	.06
Brevity	.07*	-.04	-.01
Informality	.08*	-.12*	-.01
F	122.17*	13.61*	9.96*
Multiple R	.88	.53	.47
R <sup>2</sup>	.78 <sup>1</sup>	.28 <sup>1</sup>	.22

\*p &lt; .01

<sup>1</sup>increase in R<sup>2</sup> is significant

TABLE 13

MULTIPLE REGRESSION ANALYSIS FOR HYPOTHESIS 8  
WITH RESULTING BETA WEIGHTS AND PERTINENT STATISTICS

Independent Variables	Dependent Variables		
	Satisfaction with Supervision	Job Satisfaction	Work Unit Effectiveness
Step one			
Role clarity	.14**	.21**	.31**
Trustworthiness	.40**	.23**	.13**
Informativeness	.42**	.15**	.19**
Dynamism	.11**	.06	-.03
F	236.01**	30.26**	30.10**
Multiple R	.86	.52	.52
R <sup>2</sup>	.75	.28	.27
Step two			
Role clarity	.09**	.20**	.31**
Trustworthiness	.20**	.19**	.12*
Informativeness	.36**	.20**	.19**
Dynamism	.09**	.09	-.04
Careful presentation	-.01	-.11**	-.06
Two-way communication	.20**	.18**	-.02
Frankness	.02	.05	.06
Careful listening	.04	.07	.08
Brevity	.06**	-.05	-.03
Informality	.08**	-.12**	-.02
F	112.29**	13.58**	12.10**
Multiple R	.88	.55	.52
R <sup>2</sup>	.77 <sup>1</sup>	.30	.28

\*p<.05    \*\*p<.01    <sup>1</sup>increase in R<sup>2</sup> is significant

TABLE 14

ANALYSIS OF PATH RELATIONSHIPS:  
SATISFACTION WITH SUPERVISION

Bivariate relationship	Total Corr (A)	Synthetic Corr (B)	Difference between A and B
Satsup - Listen	.53	.51	.02
Satsup - Two-way	.72	.72	--
Satsup - Formal	.61	.58	.03
Satsup - Frank	.58	.53	.05
Satsup - Brevity	.47	.41	.06
Satsup - CP	.43	.40	.03
Satsup - Trust	.74	.69	.05
Satsup - Info	.78	.75	.03
			$\bar{X} = .03$

TABLE 15

ANALYSIS OF PATH RELATIONSHIPS:  
JOB SATISFACTION

Bivariate relationship	Total Corr (A)	Synthetic Corr (B)	Difference between A and B
Jobsat - Listen	.29	.26	.03
Jobsat - Two-way	.44	.45	.01
Jobsat - Frank	.27	.27	--
Jobsat - Formal	.29	.28	.01
Jobsat - Brevity	.18	.18	--
Jobsat - CP	.16	.15	.01
Jobsat - Role clarity	.43	.42	.01
Jobsat - Trust	.46	.38	.08
Jobsat - Info	.44	.36	.08
			$\bar{X} = .025$

TABLE 16

ANALYSIS OF PATH RELATIONSHIPS:  
WORK UNIT EFFECTIVENESS

Bivariate relationship	Total Corr (A)	Synthetic Corr (B)	Difference between A and B
Weff - Listen	.29	.26	.03
Weff - Two-way	.36	.37	.01
Weff - Frank	.28	.25	.02
Weff - Formal	.30	.29	.01
Weff - Brevity	.22	.20	.02
Weff - CP	.20	.19	.01
Weff - Role clarity	.48	.43	.05
Weff - Trust	.39	.35	.04
Weff - Info	.41	.33	.08
			$\bar{X} = .03$

FIGURE 1  
MODEL REPRESENTING IMPACT OF FOCAL MANAGER'S INTERPERSONAL  
COMMUNICATION STYLE ON COLLEAGUES

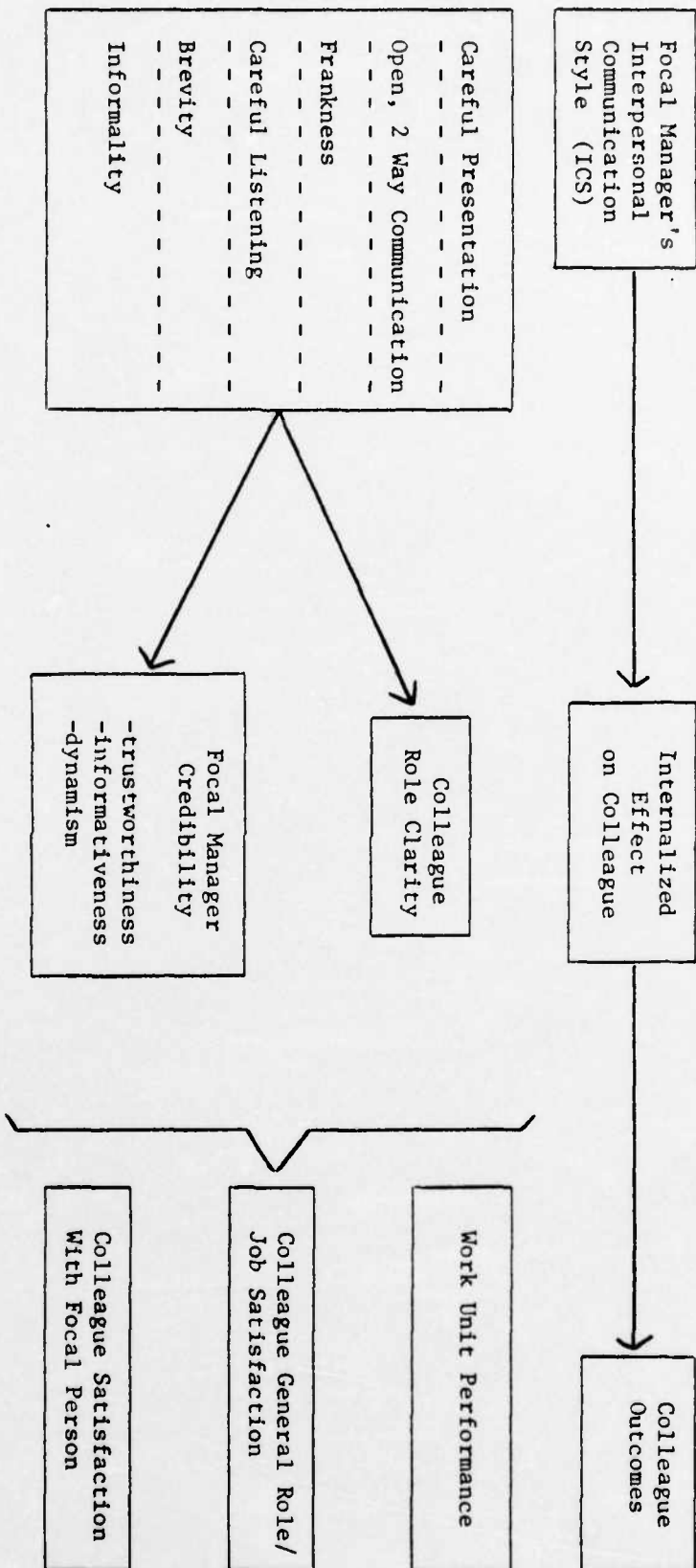
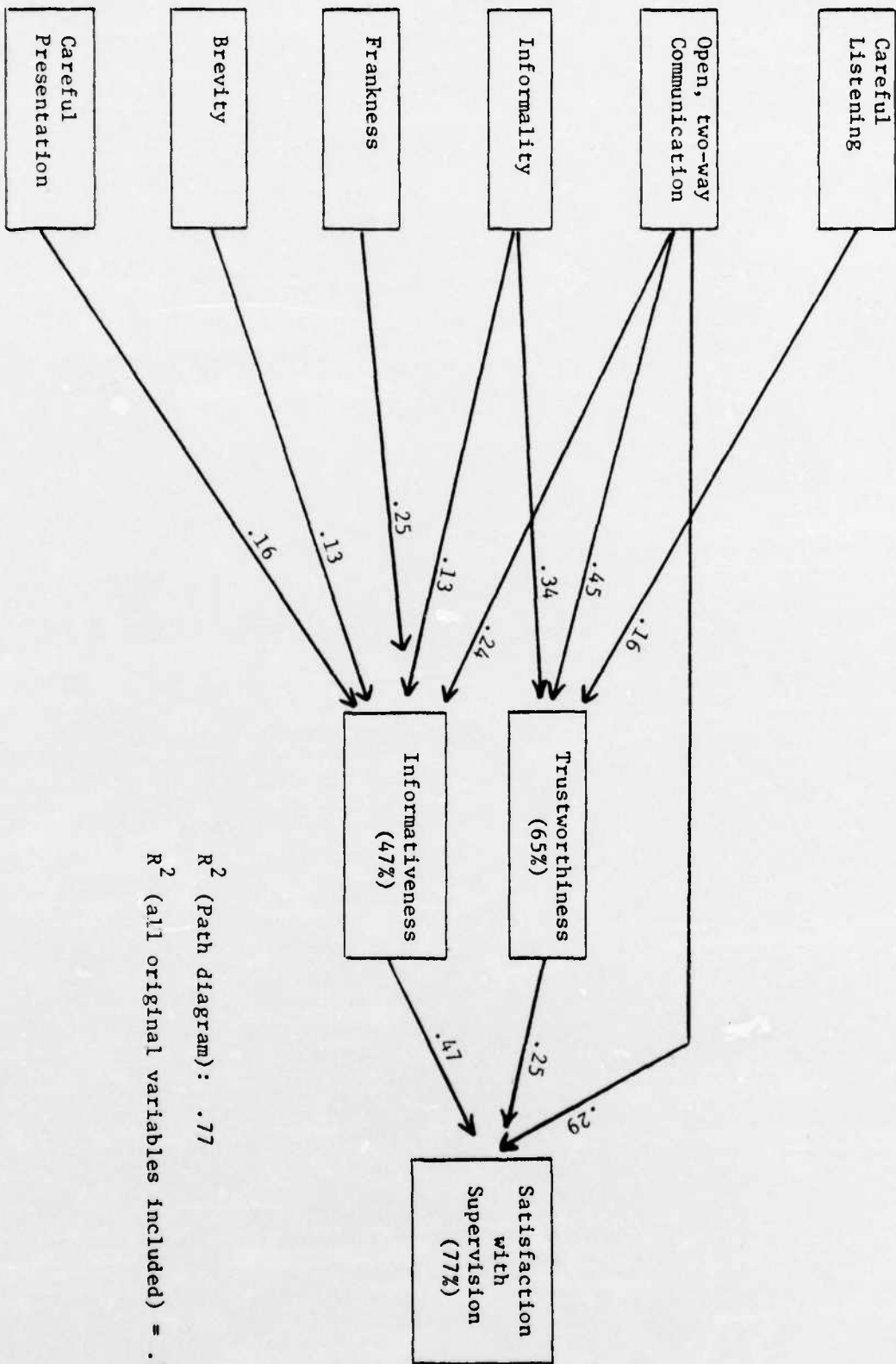


FIGURE 2

PATH ANALYSIS - SATISFACTION WITH SUPERVISION

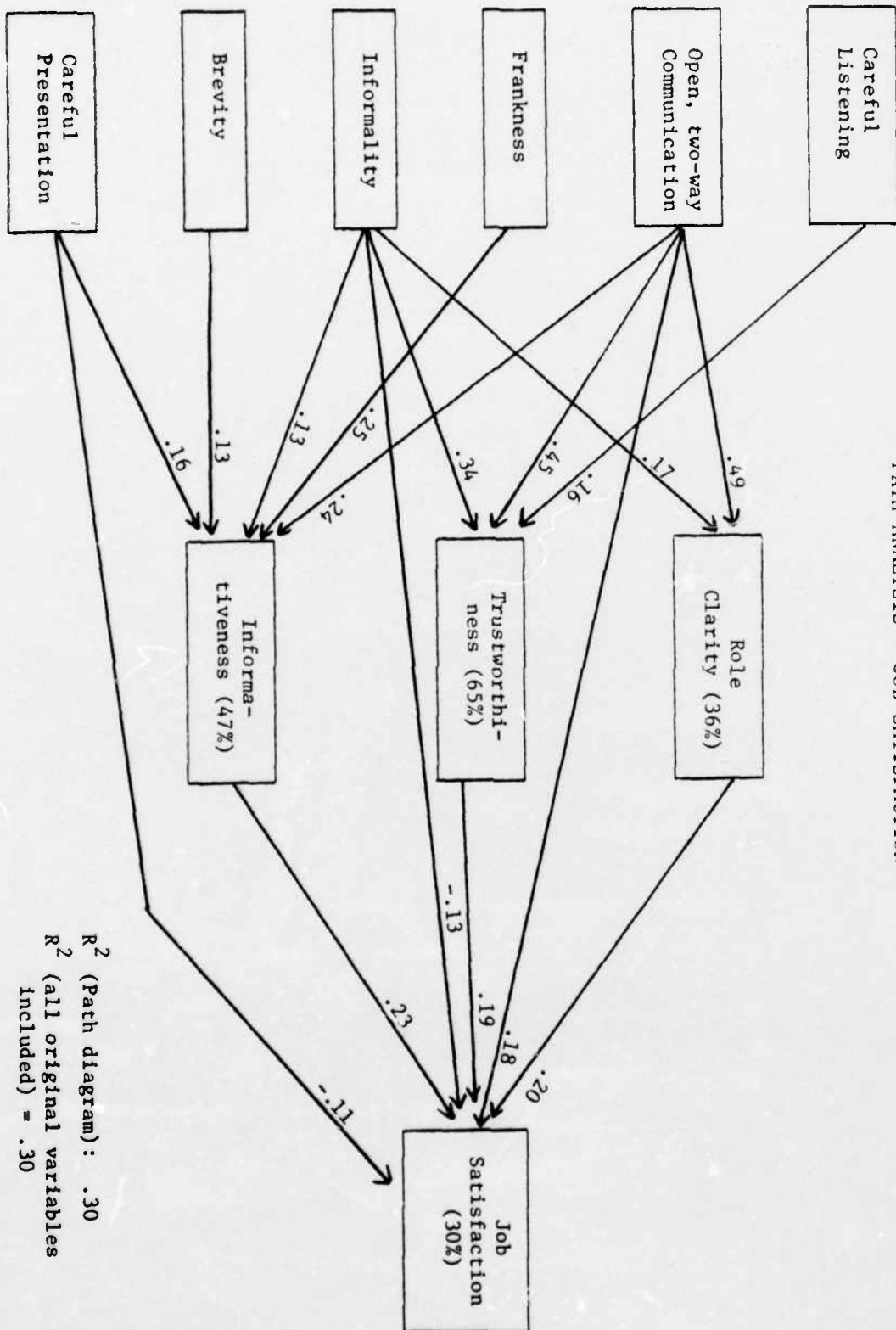


$R^2$  (Path diagram): .77

$R^2$  (all original variables included) = .77

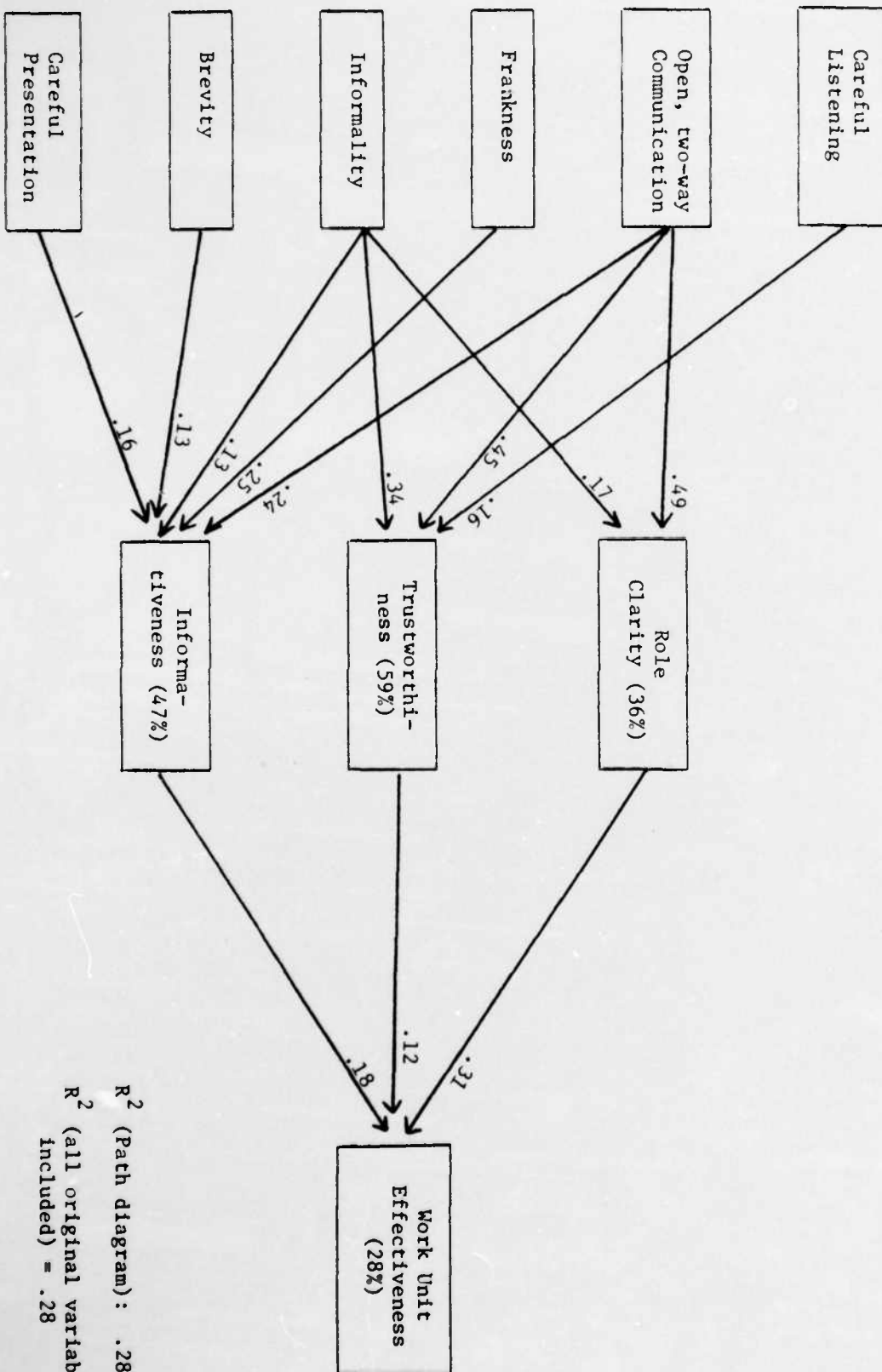
FIGURE 3

## PATH ANALYSIS - JOB SATISFACTION



PATH ANALYSIS - WORK UNIT EFFECTIVENESS

FIGURE 4





# REFERENCES

- Barnard, C.I. The Functions of the Executive. Cambridge: Harvard University Press, 1938.
- Bass, B.M. and Enzo R. Valenzi. Contingent Aspects of Effective Management Styles. Technical Report 67, Management Research Center, University of Rochester, Rochester, N.Y., 1974.
- Berlo, D.K. and J.B. Lemert and R.J. Mertz. Dimensions for Evaluating the Acceptability of Message Sources. Public Opinion Quarterly, Winter, 1969-1970, XXXIII, (4), 563-576.
- Blalock, H.M., Jr. Path Coefficients versus Regression Coefficients. American Journal of Sociology, 1967, 72, 675-676.
- Duncan, O.D. Path Analysis: Sociological Examples. American Journal of Psychology, 1966, 72, (1), 1-17.
- Falcione, G.W. and M.L. Weber. Managerial Success: A Study of Value and Demographic Correlates. ONR Technical Report, Center for the Study of Organizational Performance and Human Effectiveness, University of Minnesota, Minneapolis, 1974.
- Heise, D.R. Problems in Path Analysis and Causal Inference. In E.F. Borgatta (ed.). Sociological Methodology. San Francisco, California: Jossey-Bass, Inc., 1969, pp. 38-73.
- House, R.J. and J.R. Rizzo. Role Conflict and Ambiguity as Critical Variables in a Model of Organization Behavior. Organizational Behavior and Human Performance, 1972, 7, 467-505.
- Katz, D. and R. Kahn. The Social Psychology of Organizations, New York: John Wiley and Sons, Inc., 1966.
- Keller, R.T. Role Conflict and Ambiguity: Correlates with Job Satisfaction and Values. Personnel Psychology, 1975, 28, 57-64.
- Kerlinger, F.N. and E.L. Pedhazur. Multiple Regressions in Behavioral Research, New York: Holt, Rinehart and Winston, Inc., 1973.

- Klauss, Rudi. Dimensions of Managerial Interpersonal Communication Behavior and their Relation to Measures of Satisfaction and Performance. (Ph.D. dissertation, University of Rochester), 1976.
- Klauss, Rudi. Development of the Bass-Klauss Impact Model of Interpersonal Communication. ONR Technical Report I, Contract No. N0001476-C-0912, 1977.
- Land, Kenneth C. Principles of Path Analysis. Sociological Methodology 1969, Borgatta, E.F. (ed.), San Francisco: Jossey-Bass, Inc., 1969.
- Miles, R.H. An Empirical Test of Causal Inference Between Role Perceptions of Conflict and Ambiguity and Various Personal Outcomes. Journal of Applied Psychology, 1975, 60, (3), 334-339.
- Nie, N.H., C.H. Hull, J.G. Jenkins, K. Steinbrenner, and D.H. Bent. SPSS: Statistical Package for the Social Sciences, (second edition), New York: McGraw-Hill, 1975.
- Organ, D.W. and C.N. Greene. The Perceived Purposefulness of Job Behavior: Antecedents and Consequences. Academy of Management Journal, 1974, 17, (1), 69-78.
- Porter, L. and K. Roberts. Communication in Organizations. Technical Report No. 12, July 1972. ONR Contract No. N0001469-A-02000 9001. University of California, Irvine.
- Rizzo, J.R., R.J. House, and S. Lirtzman. Role Conflict and Ambiguity in Complex Organizations. Administrative Science Quarterly, 1970, 15, 150-163.
- Smith, P.C., L.M. Kendall, and C.L. Hulin. The Measurement of Satisfaction in Work and Retirement, Chicago: Rand McNally and Co., 1969.
- Solomon, R. The Importance of Manager-Subordinate Perceptual Differences to the Study of Leadership, University of Rochester, unpublished Ph.D. dissertation, 1975.
- Thayer, Lee. Communication and Organization Theory. In Human Communication Theory - Original Essays, F.E.X. Dance (ed.), New York: Holt, Rinehart and Winston, Inc., 1967, 70-115.

Wright, S. Correlation and Causation. Journal of  
Agricultural Research, 1921, (20), 557-585.

Wright, S. The Method of Path Coefficients. Annals of  
Mathematical Statistics, 1934, (5), 161-215.

## APPENDIX A

## COMMUNICATION SURVEY

## Biographical Information

The following information is requested to permit a statistical description of the overall population of respondents. This information will be analyzed so as not to identify any specific individual or particular work unit. Please answer every question.

- \_\_\_\_\_ 1. Age      2. Sex: Male      Female      (Circle appropriate one).
- \_\_\_\_\_ 3. Education (check highest level completed)
- \_\_\_\_\_ high school degree      \_\_\_\_\_ Master's degree
- \_\_\_\_\_ two year college degree      \_\_\_\_\_ Ph.D.
- \_\_\_\_\_ Bachelor's degree      \_\_\_\_\_ Other (please specify)
- \_\_\_\_\_ 4. How many members, including your boss, are there in your immediate work group (the group in which you and others at your level report to a common superior)?
- \_\_\_\_\_ 5. Years of service in present organization.
- \_\_\_\_\_ 6. Length of time in current position?
- \_\_\_\_\_ 7. How long have you worked under your current boss?
- \_\_\_\_\_ 8. How many levels are below you in this organization (your organization is the name that is on your letterhead)?
- \_\_\_\_\_ 9. What is the primary function of your department/division/unit?
- |   |                            |
|---|----------------------------|
| 1. Production   | 6. Client Services         |
| 2. Purchasing   | 7. General Administration  |
| 3. Research and Development                           | 8. Finance/Accounting      |
| 4. Sales, Marketing, Advertising,<br>Public Relations | 9. Personnel, Training     |
| 5. Engineering Design                                 | 10. Other (please specify) |
- \_\_\_\_\_ 10. Approximately how many people work in the department/division/unit described in item 9?
- \_\_\_\_\_ 11. Of the total communications you receive from your boss, approximately what percentage is:
- written \_\_\_\_\_ %
- face to face \_\_\_\_\_ %
- telephone \_\_\_\_\_ %
- 100%

12. Of the total amount of communication from you boss, what percentage of it is:

immediate job/task related \_\_\_\_\_ %  
 other organizational related \_\_\_\_\_ %  
 personal/social \_\_\_\_\_ %  
 100%

13. How well do you know your boss (check one of the below alternatives):

\_\_\_\_\_ better than any boss I've had  
 \_\_\_\_\_ better than most bosses I've had  
 \_\_\_\_\_ average compared to other bosses I've had  
 \_\_\_\_\_ less than most bosses I've had  
 \_\_\_\_\_ know least compared to other bosses I've had

14. How close is your desk to the desk of your supervisor (check one):

\_\_\_\_\_ close (within 100 feet or so)  
 \_\_\_\_\_ nearby (more than 100 feet but on the same floor)  
 \_\_\_\_\_ on a different floor in the same building  
 \_\_\_\_\_ in a separate building

Use the scale below to answer the questions which follow:

5 = extremely important  
 4 = very important  
 3 = moderately important  
 2 = only slightly important  
 1 = not at all important

- \_\_\_\_\_ 15. How important is it to you to know, in detail, what you have to do on a job?
- \_\_\_\_\_ 16. How important is it to you to know, in detail, how you are supposed to do a job?
- \_\_\_\_\_ 17. How important is it to you to know, in detail, what the limits of your authority on a job are?
- \_\_\_\_\_ 18. How important is it to you to know how well you are doing?
- \_\_\_\_\_ 19. How important are each of the following sources in having a clear definition and understanding of the overall responsibilities that go with the position you currently occupy?

(Place an appropriate number opposite each source listed):

_____ peers	_____ subordinates
_____ supervisor	_____ the job itself
_____ written job description	_____ prior experience

## PART ICS: INTERPERSONAL COMMUNICATION STYLE OF SUPERVISOR

The items in this section describe behaviors which people may exhibit when they communicate with others in an organizational setting. You are asked to respond to these items as they apply to your own immediate supervisor. In the blank space next to each statement write the number which best describes how frequently your own boss behaves or acts that way.

The numbers represent the following descriptive terms:

- 1 = Never
- 2 = Once in a while
- 3 = Sometimes
- 4 = Fairly often
- 5 = Usually
- 6 = Constantly
- 7 = Always

Example:

- 6 He encourages others to speak their mind.  
(The respondent's "6" indicates that his boss constantly encourages others to speak their mind.)
1. He interrupts with his own comments before others can finish a statement.
2. He speaks deliberately when he communicates.
3. He dominates discussions.
4. He chooses his words carefully.
5. He asks for my own views on problems and issues.
6. He keeps his mind on what the speaker is saying.
7. He is very informal and relaxed when he communicates.
8. He organizes his thoughts before he speaks.
9. He is frank in saying what he really thinks.
10. His comments are brief and to the point.
11. He is polished in his choice of words.
12. He goes out of his way to find out information which may be relevant to his work responsibilities.

- \_\_\_ 13. He follows up conversations with feedback.
- \_\_\_ 14. He jumps to conclusions before all the information is presented.
- \_\_\_ 15. He's very natural in the way he relates to others.
- \_\_\_ 16. He gives me feedback on my suggestions and comments.
- \_\_\_ 17. He tends to run off at the mouth.
- \_\_\_ 18. He says what he thinks without mincing words.
- \_\_\_ 19. He is receptive to points of view which differ from his.
- \_\_\_ 20. He takes a lot of words to say something which could be said in a very few words.
- \_\_\_ 21. He conveys self-confidence in expressing his views.
- \_\_\_ 22. He lets me finish my point before he comments.
- \_\_\_ 23. He levels with others when he disagrees with their viewpoints.
- \_\_\_ 24. He fidgets when people speak to him.
- \_\_\_ 25. He drifts from topic to topic during the course of a conversation.

## PART JS: YOUR JOB SATISFACTION

The statements in this part pertain to your work and your supervisor. Some items are mainly about your own job responsibilities, while others concern your own views about your boss's behavior and actions at work. In the blank space next to each statement write the number which best describes the extent to which you agree or disagree with that particular statement.

The numbers represent the following:

- 1 = Completely disagree
- 2 = Very much disagree
- 3 = Moderately disagree
- 4 = Neither agree nor disagree; undecided
- 5 = Moderately agree
- 6 = Very much agree
- 7 = Completely agree

- \_\_\_ 1. My boss is a very good natured person.
- \_\_\_ 2. I think he is very well trained for his job.
- \_\_\_ 3. I know what my own job responsibilities are.
- \_\_\_ 4. My boss is very aggressive in his work.
- \_\_\_ 5. My boss is very well qualified for his job.
- \_\_\_ 6. He is very honest in his dealings with others at work.
- \_\_\_ 7. I feel certain about how much authority I have.
- \_\_\_ 8. My boss is a very hesitant person.
- \_\_\_ 9. I consider my boss to be very friendly.
- \_\_\_ 10. He is very well informed on issues concerning his areas of responsibility.
- \_\_\_ 11. Explanations are clear to me concerning what I have to do.
- \_\_\_ 12. My boss is very energetic in his job.
- \_\_\_ 13. He tends to be very pleasant company.
- \_\_\_ 14. I think he has the appropriate prior experience necessary for his job.
- \_\_\_ 15. I work on unnecessary things.



- \_\_\_\_ 16. I have to do things that should be done differently.
- \_\_\_\_ 17. My boss is a timid person at work.
- \_\_\_\_ 18. I receive assignments without the manpower to complete them.
- \_\_\_\_ 19. My boss is very fair in his dealings on the job.
- \_\_\_\_ 20. I know exactly what is expected of me in my job.
- \_\_\_\_ 21. I know that I have divided my time properly.
- \_\_\_\_ 22. My boss is very just in his dealings on the job.
- \_\_\_\_ 23. I have to buck rules or policies in order to carry out assignments.
- \_\_\_\_ 24. My boss is a very forceful person.
- \_\_\_\_ 25. He is very skilled in his work.
- \_\_\_\_ 26. I work with two or more groups who operate quite differently.
- \_\_\_\_ 27. My boss is very active at work.
- \_\_\_\_ 28. He is a very cooperative person to work under.
- \_\_\_\_ 29. I receive incompatible requests from two or more people.
- \_\_\_\_ 30. I do things that are apt to be accepted by one person and not accepted by others.
- \_\_\_\_ 31. I have clear, planned goals and objectives for my job.
- \_\_\_\_ 32. I receive assignments without adequate resources and materials to execute them.

## PART EF: EFFECTIVENESS AND SATISFACTION

The statements in this part are about effectiveness and satisfaction. You will be asked to judge how effective various aspects of your work situation are, or how satisfied you are with them. In the blank space next to each statement write the number which best describes your overall judgment about the statement.

Use the scale below for items 1-4:

- 5 = Extremely effective
- 4 = Very effective
- 3 = Effective
- 2 = Only slightly effective
- 1 = Not effective

- \_\_\_\_\_ 1. The overall work effectiveness of your unit can be classified as:
- \_\_\_\_\_ 2. Compared to all other units you have ever known, how do you rate the effectiveness of your unit?
- \_\_\_\_\_ 3. How effective is your supervisor in meeting the job-related needs of the people who report to him?
- \_\_\_\_\_ 4. How effective is your supervisor in meeting the requirements of the organization?

Use the scale below for items 5-11:

- 5 = Very satisfied
- 4 = Fairly satisfied
- 3 = Neither satisfied nor dissatisfied
- 2 = Somewhat dissatisfied
- 1 = Very dissatisfied

- \_\_\_\_\_ 5. All in all, how satisfied are you with this organization compared to others you know?
- \_\_\_\_\_ 6. All in all, how satisfied are you with your job?
- \_\_\_\_\_ 7. How satisfied do you feel with your chances for getting ahead in this organization in the future?
- \_\_\_\_\_ 8. How satisfied are you that your own interests and abilities are being effectively used by the job you have?

- \_\_\_\_\_ 9. How satisfied do you feel with the progress you have made in the organization up to now?
- \_\_\_\_\_ 10. All in all, how satisfied are you with your supervisor?
- \_\_\_\_\_ 11. In general, how satisfied are you that the methods of leadership used by your supervisor are the right ones for getting your group's job done?

Use the scale below for item 12:

- 5 = Very high degree  
4 = High degree  
3 = Moderate degree  
2 = Slight degree  
1 = Very low degree

- \_\_\_\_\_ 12. To make your work unit the most effective unit you have ever known, to what degree are improvements needed?

## MASTER DISTRIBUTION LIST

### MANDATORY

Office of Naval Research  
(Code 452)  
800 N. Quincy Street  
Arlington, VA 22217

Director  
U.S. Naval Research Laboratory  
Washington, DC 20390  
ATTN: Technical Information Division

Defense Documentation Center  
Building 5  
Cameron Station  
Alexandria, VA 22314

Library, Code 2029  
U.S. Naval Research Laboratory  
Washington, DC 20390

Science & Technology Division  
Library of Congress  
Washington, DC 20540

### ONR FIELD

Director  
ONR Branch Office  
495 Summer Street  
Boston, MA 02210

Psychologist  
ONR Branch Office  
495 Summer Street  
Boston, MA 02210

Director  
ONR Branch Office  
536 S. Clark Street  
Chicago, IL 60605

Director  
ONR Branch Office  
1030 E. Green Street  
Pasadena, CA 91106

Psychologist  
ONR Branch Office  
1030 E. Green Street  
Pasadena, CA 91106

Research Psychologist  
ONR Branch Office  
536 S. Clark Street  
Chicago, IL 60605

### PRINCIPAL INVESTIGATORS

Dr. Macy L. Abrams  
Navy Personnel R&D Center  
San Diego, CA 92152

Dr. James A. Bayton  
Department of Psychology  
Howard University  
Washington, DC 20001

Dr. H. Russell Bernard  
Department of Sociology and  
Anthropology  
West Virginia University  
Morgantown, WV 26506

Dr. Arthur Blaiwes  
Naval Training Equipment Center  
Orlando, FL 32813

Dr. Milton R. Blood  
School of Business  
Georgia Institute of Technology  
Atlanta, GA 30332

Dr. Harry R. Day  
University City Science Center  
Center for Social Development  
3508 Science Center  
Philadelphia, PA 19104

Dr. Fred E. Fiedler  
Department of Psychology  
University of Washington  
Seattle, WA 98105

Dr. Samuel L. Gaertner  
Department of Psychology  
University of Delaware  
220 Wolf Hall  
Newark, DE 19711

Dr. William E. Gaymon  
Suite 200  
1055 Thomas Jefferson St., NW  
Washington, DC 20007

Dr. Paul S. Goodman  
Graduate School of Industrial  
Administration  
Carnegie-Mellon University  
Schenley Park  
Pittsburgh, PA 15213

Dr. M. Dean Havron  
Human Sciences Research, Inc.  
7710 Old Springhouse Road  
McLean, VA 22101

Dr. Edwin Hollander  
Department of Psychology  
SUNY at Buffalo  
4230 Ridge Lea Road  
Buffalo, New York 14226

Dr. Charles L. Hulin  
Department of Psychology  
University of Illinois  
Champaign, IL 61820

Dr. Rudi Klauss  
Syracuse University  
Department of Public Administration  
Maxwell School  
Syracuse, New York 13210

Dr. Arie Lewin  
Duke University  
Duke Station  
Durham, NC 27706

Dr. Morgan W. McCall, Jr.  
Center for Creative Leadership  
5000 Laurinda Drive  
P.O. Box P-1  
Greensboro, NC 27402

Dr. Terence R. Mitchell  
School of Business Administration  
University of Washington  
Seattle, WA 98195

Dr. Richard T. Mowday  
College of Business Administration  
University of Nebraska, Lincoln  
Lincoln, NB 68588

Dr. Peter G. Nordlie  
Human Sciences Research, Inc.  
7710 Old Springhouse Rd.  
McLean, VA 22101

Dr. Johannes M. Pennings  
Graduate School of Industrial  
Administration  
Carnegie-Mellon University  
Schenley Park  
Pittsburgh, PA 15213

Dr. Lyman W. Porter  
University of California  
Dean, Graduate School of  
Administration  
Irvine, CA 92650

Dr. Manuel Ramirez  
Systems and Evaluations  
232 Swanton Blvd.  
Santa Cruz, CA 95060

Dr. Irwin Sarason  
Department of Psychology  
University of Washington  
Seattle, WA 98195

Dr. Barry R. Schlenker  
Department of Psychology  
University of Florida  
Gainesville, FL 32611

Dr. S.B. Sells  
Texas Christian University  
Fort Worth, TX 76129

Dr. Gerald H. Shure  
University of California  
Department of Psychology  
Los Angeles, CA 90024

Dr. H. Wallace Sinaiko  
Program Director  
Manpower Research & Advisory  
Services, Smithsonian Institution  
801 N. Pitt St.  
Suite 120  
Alexandria, VA 22314

Dr. Richard Steers  
Graduate School of Mgmt. & Business  
University of Oregon  
Eugene, OR 97403

Dr. Eugene F. Stone  
Department of Administrative Sciences  
Purdue University  
West Lafayette, IN 47907

Dr. Richard E. Sykes  
Minnesota Systems Research, Inc.  
2412 University Avenue  
Minneapolis, MN 55414

Dr. Lorand B. Szalay  
Suite 200  
1055 Thomas Jefferson St., NW  
Washington, DC 20007

Dr. Victor H. Vroom  
School of Organizational Management  
Yale University 56  
56 Hillhouse Avenue  
New Haven, CT 06520

Dr. Paul Wall  
Division of Behavioral Science  
Tuskegee Institute  
Tuskegee, AL 36088

Army

Army Research Institute  
Commonwealth Building  
1300 Wilson Blvd.  
Rosslyn, VA 22209

Marine Corps

Dr. A.L. Slafkosky  
Code RD-1  
HQ US Marine Corps  
Washington, DC 20380

Navy

Chief of Naval Personnel  
Assistant for Research Liaison (Pers-Or)  
Washington, DC 20370

Bureau of Naval Personnel (Pers 6)  
Assistant Chief of Naval Personnel for  
Human Resource Management  
Washington, DC 20370

CDR Paul D. Nelson, MSC, USN  
Head, Human Performance Division (Code 44)  
Navy Medical R&D Command  
Bethesda, MD 20014

Naval Postgraduate School  
Monterey, CA 93940  
ATTN: Library (Code 2124)

Professor John Senger  
Operations Research & Adminis-  
tration Sciences  
Naval Postgraduate School  
Monterey, CA 93940

Training Officer  
Human Resource Management Center  
San Diego, CA 92133 NTC

Scientific Director  
Naval Health Research Center  
San Diego, CA 92152

Navy Personnel R&D Center  
Code 01  
San Diego, CA 92152

Commanding Officer  
Naval Submarine Medical  
Research Laboratory  
Naval Submarine Base New London  
Box 900  
Groton, CT 06340

Commanding Officer  
Naval Training Equipment Center  
Technical Library  
Orlando, FL 32813

Naval Aerospace Medical  
Research Laboratory  
(Code L5)  
Naval Aerospace Medical Center  
Pensacola, FL 32512

Lt. Rebecca G. Vinson, U.S.N.  
Navy Recruiting District, Boston  
575 Technology Square  
Cambridge, MA 92139

Chief, Naval Technical Training  
NAS Memphis (75)  
Millington, TN 38054  
ATTN: Mr. Tom Warrick, N622

Dr. C. Brooklyn Derr  
Associate Professor, Code 55  
Naval Postgraduate School  
Monterey, CA 93940

Human Resource Management Center  
Box 23,  
FPA New York 09510

Human Resource Management Center, Norfolk  
5621-23 Tidewater Drive  
Norfolk, VA 23511

Human Resource Management Center  
Building 304  
Naval Training Center  
San Diego, CA 92133

Office of Naval Research (Code 200)  
Arlington, VA 22217

ACOS Research & Program Development  
Chief of Naval Education & Training (N-5)  
Naval Air Station  
Pensacola, FL 32508

Human Resource Management Center  
Pearl Harbor  
FPO San Francisco, CA 96601

Human Resource Management School  
Naval Air Station Memphis (96)  
Millington, TN 38054

Capt. Charles Baldwin  
Bureau of Naval Personnel  
Pers 65  
Washington, DC 20370

Director, Human Resource Training Department  
Naval Amphibious School  
Little Creek  
Naval Amphibious Base  
Norfolk, VA 23521

Navy Materiel Command  
Employee Development Office (Code SA-65)  
Room 150 Jefferson Plaza, Bldg., #2  
1420 Jeff Davis Highway  
Arlington, VA 20360

Human Resource Management Center  
Washington, DC 20370

Other

Ms. Elsa A. Porter  
Clearinghouse on Productivity &  
Organizational Effectiveness  
U.S. Civil Service Commission  
Washington, DC 20415

Mr. Luigi Petrullo  
2431 N. Edgewood Street  
Arlington, VA 22207

Dr. John J. Collins  
6305 Caminito Estrellado  
San Diego, CA 92120